

### **AMENDMENTS TO THE DRAWINGS**

The attached sheet of drawings includes changes to Figs. 8A and 8B. The attached sheet including Figs. 8A and 8B replaces the original sheet including Figs. 8A and 8B.

Attachment:      Replacement sheet

**Remarks**

In the foregoing claim amendments, claims 8, 15, 20, 26, 33, 40 and 45 have been amended. No new matter has been added. Now pending in the application are claims 1-87, of which claims 1-7, 13-14, 19, 21, 23-25, 31-32, 38-39, 44, 46, 48-51 and 68-76 have been withdrawn from further consideration. Amongst the remaining claims, claims 8, 15, 20, 26, 33, 40 and 45 are independent. The following comments address all stated grounds for rejection, and Applicants respectfully submit that the presently pending claims, as identified above, are now in a condition of allowance.

**I. Summary of Objections and Rejections**

The drawings are objected to because of minor informalities.

The specification is objected to because of minor informalities.

Claims 8-12 and 55-63 are objected to because of minor informalities in claim 8.

Claims 20-22, 26-30, 45, 47 and 64-67 are rejected under 35 U.S.C. §101 as being drawn to non-statutory subject matter.

Claims 15-18, 40-43, 52-67 and 77-87 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Claims 8-12, 15-18, 20, 22, 26-30, 33-37, 40-43, 45, 47, 52-67 and 77-87 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Claims 8-12, 15-18, 20, 22, 26-30, 33-37, 40-43, 45, 47, 52-67 and 77-87 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 03/001891.

Claims 8-12, 15-18, 20, 22, 26-30, 33-37, 40-43, 45, 47, 52-67 and 77-87 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-36 of co-pending U.S. Patent Application No. 10/783,552.

These objections and rejections will be discussed separately below.

## **II. Drawings**

The drawings have been objected to because the symbol followed by the text “0x” in Figs. 8A and 8B is not clear. (See the Office Action, page 4). Applicants have amended Figs. 8A and 8B to clarify that the symbol is “&.” As such, Applicants request withdrawal of the objection to the drawings.

## **III. Specification**

The abstract is objected to because of minor informalities. (See the Office Action, page 5). Applicants have amended the abstract to remove the title. Applicants have also amended the abstract to change the term “said” to “the.”

The Examiner requests that trademarks be capitalized and accompanied by the generic terminology in the specification. (See the Office Action, page 5). Applicants have amended the specification to capitalize trademarks contained in the specification.

The specification has been objected to because it recited embedded hyperlinks and/or other form of browser-executable code. (See the Office Action, page 6). Applicants have amended the specification to remove the hyperlinks that were listed in the specification.

Applicants have also amended the specification to address the other informalities specified by the Examiner. (See the Office Action, page 5). As such, Applicants respectfully request withdrawal of the objections to the specification.

## **IV. Claim Objections**

Claims 8-12 and 55-63 are objected to because of the phrase “a the” in claim 8. (See the Office Action, page 13). Applicants have amended claim 8 to delete the letter “a”. As such, Applicants respectfully request withdrawal of the objections to the claims.

**V. Claim Rejections under 35 U.S.C. §101**

Claims 20-22, 26-30, 45, 47 and 64-67 are rejected under 35 U.S.C. §101 as being drawn to non-statutory subject matter. (See the Office Action, page 6). Applicants respectfully traverse the rejection.

The Examiner stated that “the invention does not produce a useful, concrete and tangible result.” Specifically, the Examiner stated “it does not produce a tangible result.” (See the Office Action, page 7). Applicants have amended claims 20, 45 to recite that “the result is saved in a storage element.” Applicants have also amended claim 26 to recite that “the expected output is saved in a storage element.” The claims now produce tangible results and are directed to statutory subject matter. Claims 21-22, 27-30, 47 and 64-67, which depend upon one of claims 20, 26 and 45, incorporate the statutory subject matter of claims 20, 26 and 45. As such, Applicants request withdrawal of the rejection.

**VI. Claim Rejections under 35 U.S.C. §112**

Claims 15-18, 40-43, 52-67 and 77-87 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. (See the Office Action, page 7). Applicants respectfully traverse the rejection.

**A. Support for Previously Added Claims**

The Examiner alleges that the specification does not provide support for the subject matter of claims 52-67 and 77-87. (See the Office Action, page 8). Applicants submit that the specification of the present application provides support for the subject matter of claims 52-67 and 77-87 as follows.

Claim 52 recites “the step of annotating the model to add user-provided annotations.” Support for the claim can be found throughout the specification and figures, for example, on page 16 lines 29-33 of the present application. No new matter has been added.

Claim 53 recites “automatically connecting elements of the model using an auto-connection tool.” Support for the claim can be found throughout the specification and figures, for example, on page 16 lines 18-28 of the present application. No new matter has been added.

Claim 54 recites “the step of providing a tabular view of the model and a graphical view of the model to the user. Support for the claim can be found throughout the specification and figures, for example, in Figures 3 and 4 of the present application. No new matter has been added.

Claim 55 recites “constructing the block diagram to include a virtual block that is provided for graphical convenience but that plays no role in the semantics of the model.” Support for the claim can be found throughout the specification and figures, for example, at page 21, lines 4-10 of the present application. No new matter has been added.

Claim 56 recites “the step of generating a report regarding the model. Support for the claim can be found throughout the specification and figures, for example, on page 5 line 15 through page 6, line 5 of the present application. No new matter has been added.

Claim 57 recites “the step of generating code for executing the model.” Support for the claim can be found throughout the specification and figures, for example, on page 12 lines 22-24 of the present application. No new matter has been added.

Claim 58 recites “the step of distributing the code for distributed execution.” Support for the claim can be found throughout the specification and figures, for example, on page 36 lines 6-13 of the present application. No new matter has been added.

Claim 59 recites “the step of creating a library from a portion of the model for reuse in another model. Support for the claim can be found throughout the specification and figures, for example, on page 17 lines 8-13 of the present application. No new matter has been added.

Claim 60 recites “using a knowledge base of chemical reactions in constructing the model.” Support for the claim can be found throughout the specification and figures, for example, on page 20 lines 13-29 of the present application. No new matter has been added.

Claim 61 recites “enabling a user to specify a rapidity of at least one of chemical reactions of the biological process.” Support for the claim can be found throughout the specification and figures, for example, on page 11 lines 22-30 of the present application. No new matter has been added.

Claim 62 recites “programmatically determining a graphical display that represents the model.” Support for the claim can be found throughout the specification and figures, for example, on page 12 lines 12-16 of the present application. No new matter has been added.

Claim 63 recites “constructing a conditionally executed sub-section that is executed upon satisfaction of a condition.” Support for the claim can be found throughout the specification and figures, for example, on page 15 lines 21-23 of the present application. No new matter has been added.

Claim 64 recites “an annotation tool for enabling a user to add annotations to the model. Support for the claim can be found throughout the specification and figures, for example, on page 16 lines 29-33 of the present application. No new matter has been added.

Claim 65 recites “an auto-connection tool for automatically connecting elements of the model. Support for the claim can be found throughout the specification and figures, for example, on page 16 lines 18-28 of the present application. No new matter has been added.

Claim 66 recites “a graphical view of the model and a tabular view of the model that are viewable by user. Support for the claim can be found throughout the specification and figures, for example, in Figures 3 and 4 of the present application. No new matter has been added.

Claim 67 recites that “the block diagram model contains a virtual block that is provided for graphical convenience but plays no role in semantics of the model. Support for the claim can be found throughout the specification and figures, for example, in at page 21, lines 4-10 of the present application. No new matter has been added.

Claim 77 recites “computer-readable program means for annotating the model to add user-provided annotations. Support for the claim can be found throughout the specification and figures, for example, on page 16 lines 29-33 of the present application. No new matter has been added.

Claim 78 recites “computer-readable program means for automatically connecting elements of the model. Support for the claim can be found throughout the specification and

figures, for example, on page 16 lines 18-28 of the present application. No new matter has been added.

Claim 79 recites “computer-readable program means for providing a tabular view of the model and a graphical view of the model. Support for the claim can be found throughout the specification and figures, for example, in Figures 3 and 4 of the present application. No new matter has been added.

Claim 80 recites “computer-readable program means for constructing at least one block identifying a set of related chemical reactions. Support for the claim can be found throughout the specification and figures, for example, at page 2, line 23 through page 3, line 4 of the present application. No new matter has been added.

Claim 81 recites “a virtual block that is provided for graphical convenience but plays no role in semantics of the model. Support for the claim can be found throughout the specification and figures, for example, in at page 21, lines 4-10 of the present application. No new matter has been added.

Claim 82 recites “computer-readable program means for generating code for executing the model. Support for the claim can be found throughout the specification and figures, for example, on page 12 lines 22-24 of the present application. No new matter has been added.

Claim 83 recites “computer-readable program means for distributing the code that is generated for distributed execution. Support for the claim can be found throughout the specification and figures, for example, on page 36 lines 6-13 of the present application. No new matter has been added.

Claim 84 recites “the computer-readable program means for constructing the model of the chemical reactions uses a knowledge base of chemical reactions to construct the model. Support for the claim can be found throughout the specification and figures, for example, on page 20 lines 13-29 of the present application. No new matter has been added.

Claim 85 recites “the computer-readable program means for constructing the model of the chemical reactions enables a user to specify a rapidity of at least one of the chemical

reactions. Support for the claim can be found throughout the specification and figures, for example, on page 20 lines 13-29 of the present application. No new matter has been added.

Claim 86 recites “the computer-readable program means for constructing the model of the chemical reactions determines a graphical display for representing the model. Support for the claim can be found throughout the specification and figures, for example, on page 12 lines 12-16 of the present application. No new matter has been added.

Claim 87 recites “the computer-readable program means for constructing the model of the chemical reactions constructs the model to include a conditional sub-section that executed upon satisfaction of a condition. Support for the claim can be found throughout the specification and figures, for example, on page 15 lines 21-23 of the present application. No new matter has been added.

As such, Applicants request withdrawal of the rejections.

**B. Support for Means Elements**

The Examiner also alleges that the specification fails to set forth an adequate disclosure showing what is meant by the means elements recited in claims 15-18, 40-43 and 77-78. (See the Office Action, page 8). Applicants submit that the specification of the present application provides an adequate disclosure showing what is meant by the means elements as follows.

Claim 15 recites “computer-readable program means for constructing a model of a biological process, wherein said model is constructed or modified by instructions received through both a graphical user interface and a textual interface.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Modeling Environment (110) and page 15, line 25 through page 16, line 17.

Claim 15 recites “computer-readable program means for generating, using the constructed model of the biological process, an expected output of the modeled biological process.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Simulation Engine (120).



Claim 15 recites “computer-readable program means for displaying the dynamic behavior.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Analysis Environment (130).

Claim 16 recites “computer-readable program means for constructing a block diagram model of a biological process.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Modeling Environment (110).

Claim 17 recites “computer-readable program means for constructing at least one block identifying a set of related chemical reactions.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Modeling Environment (110).

Claim 18 recites “computer-readable program means for generating an expected result of the modeled biological process using a stochastic computational model.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Simulation Engine (120).

Claim 40 recites “computer-readable program means for constructing a model of a chemical reaction, wherein said model is constructed or modified by instructions received through both a graphical user interface and a textual interface.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Modeling Environment (110) and page 15, line 25 through page 16, line 17.

Claim 40 recites “computer-readable program means for generating, using the constructed model of the chemical reaction, an expected output of the modeled chemical reaction.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Simulation Engine (120).

Claim 40 recites “computer-readable program means for displaying the expected output.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Analysis Environment (130).

Claim 41 recites “computer-readable program means for constructing a block diagram model of a chemical reaction.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Modeling Environment (110).

Claim 42 recites “computer-readable program means for constructing at least one block identifying a set of related chemical reactions.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Modeling Environment (110).

Claim 43 recites “computer-readable program means for generating an expected result of the modeled chemical reaction using a stochastic computational model. Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Simulation Engine (120).

Claim 77 recites “computer-readable program means for annotating the model to add user-provided annotations. Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Simulation Engine (120).

Claim 78 recites “computer-readable program means for automatically connecting elements of the model.” Support for the computer-readable program means can be found throughout the specification and figures, for example, Fig. 1, Simulation Engine (120).

As such, Applicants request withdrawal of the rejections.

## **VII. Claim Rejections under 35 U.S.C. §112**

Claims 8-12, 15-18, 20, 22, 26-30, 33-37, 40-43, 45, 47, 52-67 and 77-87 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. (See the Office Action, page 9). Applicants respectfully traverse the rejection.

### **A. Term “Manipulable”**

The Examiner alleges that the term “manipulable” in claims 8, 15, 20, 26, 33, 40 and 45 is a relative term, which renders the claims indefinite. (See Office Action, page 9). Applicants have amended claims 8, 15, 20, 26, 33, 40 and 45 to change the term “manipulable” to

“constructed or modified.” In view of the amendment, Applicants respectfully request withdrawal of the rejection.

**B. Means Elements**

The Examiner also alleges that “the specification does not provide an adequate disclosure showing the structure, material, or acts for these “means-plus-function limitations”” in claims 15-18, 40-43 and 77-78. (See Office Action, page 9). As discussed above in section VI.B, the specification of the present application provides an adequate disclosure showing the structure, material, or acts for the means elements recited in claims 15-18, 40-43 and 77-78. As such, Applicants request withdrawal of the rejections.

**VIII. Claim Rejections under 35 U.S.C. §102 (Kelly *et al.*)**

Claims 8-12, 15-18, 20, 22, 26-30, 33-37, 40-43, 45, 47, 52-67 and 77-87 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 03/001891 (“Kelly *et al.*”). (See the Office Action, page 10). Applicants respectfully traverse the rejection.

**A. Claims 8, 15, 20, 26, 33, 40 and 45**

Applicants respectfully submit that Kelly *et al.* fails to disclose at least the following feature of claims 8, 15, 20, 33, 40 and 45: “said model is constructed or modified by instructions received through both a graphical user interface and a textual interface,” and the following feature of claim 26: “said model being constructed or modified by instructions received through both a graphical user interface and a textual interface.”

In the Office Action, the Examiner does not discuss whether Kelly *et al.* discloses this feature. (See the Office Action, pages 11-12).

Kelly *et al.* discloses a computer model of an adaptive immune response. (See, Abstract). In Kelly *et al.*, the model may represent complex physiological regulatory mechanisms related to, for example, cellular dynamics, mediator production, antigen-presenting cell (APC) recruitment, APC maturation, lymphocyte activation, lymphocyte trafficking, and/or lymphocyte effector function. (See, Abstract).

In comparison, the present application provides a computer-implemented environment for modeling and simulation of a biological process. The environment enables a user to construct a model of the biological process. The model can be constructed or modified by instructions received through both a graphical user interface and a textual interface. For example, the instructions may be input through a graphical user interface, such as a block diagram editor as shown in FIG. 4 of the present application. The instructions may be input through a textual interface, such scripts that perform automatic editing operations on the block diagram.

Kelly *et al.* does not disclose that a model is constructed or modified by instructions received through both a graphical user interface and a textual interface. Kelly *et al.* disclose an Effect Diagram that includes a summary diagram and more detailed modules representing various biological processes. (See FIG. 2 and page 14). In Kelly *et al.*, the Effect Diagram constructed using graphical elements, such as state and function nodes (see page 15), arrows (page 17), and modifiers (page 19). Kelly *et al.* however, does not disclose a textual user interface through which instructions are received for constructing or modifying the Effect Diagram. Kelly *et al.* does not disclose that a computer model is implemented or modified by instructions received through both a graphical user interface and a textual interface.

In view of the above arguments, Applicants respectfully request withdrawal of the rejection of claims 8, 15, 20, 26, 33, 40 and 45.

**B. Claims 9-12, 16-18, 22, 27-30, 34-37, 41-43, 47, 52-67 and 77-87**

Claims 9-12 depend on base claim 8 and, as such, incorporate all of the features of claim 8. Accordingly, claims 9-12 are novel for at least the reasons set forth above with respect to claim 8. Applicants respectfully request withdrawal of the rejection of claims 9-12.

Claims 16-18 depend on base claim 15 and, as such, incorporate all of the features of claim 15. Accordingly, claims 16-18 are novel for at least the reasons set forth above with respect to claim 15. Applicants respectfully request withdrawal of the rejection of claims 16-18.

Claim 22 depends on base claim 20 and, as such, incorporates all of the features of claim 20. Accordingly, claim 22 is novel for at least the reasons set forth above with respect to claim 20. Applicants respectfully request withdrawal of the rejection of claim 22.

Claims 27-30 depend on base claim 26 and, as such, incorporate all of the features of claim 26. Accordingly, claims 27-30 are novel for at least the reasons set forth above with respect to claim 26. Applicants respectfully request withdrawal of the rejection of claims 27-30.

Claims 34-37 depend on base claim 33 and, as such, incorporate all of the features of claim 33. Accordingly, claims 34-37 are novel for at least the reasons set forth above with respect to claim 33. Applicants respectfully request withdrawal of the rejection of claims 34-37.

Claims 41-43 depend on base claim 40 and, as such, incorporate all of the features of claim 40. Accordingly, claims 41-43 are novel for at least the reasons set forth above with respect to claim 40. Applicants respectfully request withdrawal of the rejection of claims 41-43.

Claim 47 depends on base claim 45 and, as such, incorporates all of the features of claim 45. Accordingly, claim 47 is novel for at least the reasons set forth above with respect to claim 45. Applicants respectfully request withdrawal of the rejection of claim 47.

Claims 52-63 depend on base claim 8 and, as such, incorporate all of the features of claim 8. Accordingly, claims 52-63 are novel for at least the reasons set forth above with respect to claim 8. Applicants respectfully request withdrawal of the rejection of claims 53-63.

Claims 64-67 depend on base claim 26 and, as such, incorporate all of the features of claim 26. Accordingly, claims 64-67 are novel for at least the reasons set forth above with respect to claim 26. Applicants respectfully request withdrawal of the rejection of claims 64-67.

Claims 77-87 depend on base claim 40 and, as such, incorporate all of the features of claim 40. Accordingly, claims 77-87 are novel for at least the reasons set forth above with respect to claim 40. Applicants respectfully request withdrawal of the rejection of claims 77-87.

Furthermore, Applicants respectfully submit that Kelly *et al.* does not disclose “annotating the model to add user-provided annotations,” as recited in claim 52. Applicants also submit that Kelly *et al.* does not disclose “an annotation tool for annotating the model to add user-provided annotations,” as recited in claim 64. Applicants further submit that Kelly *et al.* does not disclose “computer-readable program means for annotating the model to add user-provided annotations,” as recited in claim 77.

Furthermore, Applicants respectfully submit that Kelly *et al.* does not disclose “automatically connecting elements of the model using an auto-connection tool,” as recited in claim 53. Applicants also submit that Kelly *et al.* does not disclose “an auto-connection tool for automatically connecting elements of the model,” as recited in claim 65. Applicants further submit that Kelly *et al.* does not disclose “computer-readable program means for automatically connecting elements of the model,” as recited in claim 78.

As such, Applicants request withdrawal of the rejections of claims 9-12, 16-18, 22, 27-30, 34-37, 41-43, 47, 52-67 and 77-87.

#### **IX. Double Patenting**

Claims 8-12, 15-18, 20, 22, 26-30, 33-37, 40-43, 45, 47, 52-67 and 77-87 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-36 of co-pending U.S. Patent Application No. 10/783,552. Applicants submit a terminal disclaimer in compliance with 37 CFR 1.321(c) to overcome the rejection.

**X. Conclusion**

Please charge any shortage or credit any overpayment of fees to our Deposit Account No. 12-0080, under Order No. MWS-108. In the event that a petition for an extension of time is required to be submitted herewith, and the requisite petition does not accompany this response, the undersigned hereby petitions under 37 C.F.R. §1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized to be charged to the aforementioned Deposit Account.

In view of the above comments, Applicants believe that the pending application is in condition for allowance and urges the Examiner to pass the claims to allowance. Should the Examiner feel that a teleconference would expedite the prosecution of this application, the Examiner is urged to contact the Applicant's attorney at (617) 227-7400.

Dated: August 13, 2007

Respectfully submitted,

By   
EuiHoon Lee

Registration No.: L0248  
LAHIVE & COCKFIELD, LLP  
One Post Office Square  
Boston, Massachusetts 02109-2127  
(617) 227-7400  
(617) 742-4214 (Fax)  
Attorney/Agent For Applicant